

CHAPTER TWO

ALTERNATIVES

Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures*, cites the Council on Environmental Quality (CEQ) regulations [40 CFR 1502.10(e)] regarding the development and evaluation of alternatives in a Supplemental Environmental Assessment (SEA). In summary, the SEA should present the positive and negative aspects of the proposal, reasonable alternatives to the proposal and the No Action Alternative in comparative form to provide the decision makers and the general public information on the merits of each alternative.

This Chapter presents factors for air traffic control procedure modifications; criteria for screening initial alternatives; evaluation of the initial alternatives; a summary of the initial alternatives; development of the alternative carried forward; alternatives eliminated from further consideration; and the recommended alternatives. This chapter also identifies potential alternatives for addressing the purpose and need as discussed in **Chapter One, Purpose and Need**. The alternatives were developed by the FAA to provide operational benefits, including improved efficiency of the LAS TRACON airspace, reduction of potential future delays, and provide noise relief to communities south of McCarran International Airport.

2.1 MODIFICATION OF AIR TRAFFIC PROCEDURES

Many factors may be the catalyst for modifying air traffic control procedures. These factors include, but are not limited to, safety, airspace efficiency, increasing traffic demands, operational restrictions, operational benefits for National Airspace System (NAS) users, changing fleet mix, application of new technologies, air traffic controller and flight crew workload, airport expansion, new airports, and consolidation of air traffic control facilities.

The FAA continually reviews the manner in which airspace is used, with the intent of ensuring that airspace is being used efficiently and is meeting the needs of the NAS users. Airspace reviews provide an opportunity to assess new technologies that may be applicable to the particular airspace environment of an airport, to determine if forecasted demand for an airport could be reasonably accommodated with the current procedures, and if the procedures in use conform to local noise abatement policies. Airspace reviews also serve to open dialogue between the air traffic control service provider, airport proprietors, community groups and NAS users, including commercial airlines, general aviation, and military users.

When the Four Corner-Post Plan was proposed for LAS, the Clark County Department of Aviation (CCDOA) expressed concern that by reducing the use of the OVETO SID, and retaining only the STAAV RNAV SID, future airport capacity at LAS would be negatively impacted. The STAAV RNAV SID was originally intended to be used only two percent of the time for aircraft proceeding to the north, while

eastbound flights would be routed via the proposed WYLLD and AACES RNAV SIDs. Runway 25 departures initially turn left when assigned the WYLLD and AACES procedures, while those assigned the STAAV procedures turn right.

Following implementation of the Four Corner-Post Plan in October 2001, some residents of the community of Enterprise, Nevada raised concerns that the actual flight tracks did not keep the departures centered over the CMA. In addition to the community concerns, the operators at LAS became concerned about the extra flight miles caused by reducing the use of the OVETO SID. This circumstance was exacerbated as the price for fuel continued to escalate in 2004 and 2005. The third unanticipated concern was the rise in departure delays. While LAS experienced a nine percent increase in aircraft operations between 2001 and 2004, departure delays rose from 2,677 in 2001 to 8,538 in 2004, a 31 percent increase.²⁵

The FAA has worked closely with the community of Enterprise and the CCDOA to mitigate the noise impacts by adjusting the departure procedures. Between 2001 and March 2005, FAA made several modifications to the Runway 25 departure procedures and has now achieved a 98 percent compliance rate with the Airport's Cooperative Management Area (CMA).²⁶ In response to the airline's desire to lessen flying miles and to ensure sustainable airport capacity can be maintained, the FAA intends to modify the STAAV RNAV SID to accommodate east-bound departures from Runway 25 while maintaining a high compliance rate with the Airport's Cooperative Management Area (CMA).

2.2 CRITERIA FOR SCREENING THE INITIAL ALTERNATIVES

The factors that provide the catalyst for amending air traffic control procedures are, in many cases, the factors used to evaluate the impacts of the proposed procedural change. Often, the FAA must balance those factors and the resultant change to arrive at the best possible compromise. The following criteria were used in the 2001 FEA to evaluate alternatives associated with the implementation of the Four Corner-Post Plan. Because this document, regarding the proposed modification to the STAAV RNAV SID for eastbound departures from Runway 25 at LAS, is a supplement to the 2001 FEA, the same criteria are used for evaluation of the alternatives.

- **Safety** – Does the alternative maintain or improve the level of safety under varying conditions?

²⁵ Federal Aviation Administration OPSNET Delays Report, Calendar Years 2001 to 2004.

²⁶ Clark County Department of Aviation. May 2005.

- **Traffic Management Efficiency** – Does the alternative provide an efficient method for improving the flow and management of air traffic? The route geometry should minimize intersecting routes and evenly distribute air traffic volume between routes to minimize the need to reroute traffic, thus improving the controller's ability to separate, sequence and meter traffic.
- **Air Traffic Controller Utilization** – Does the alternative provide sector boundaries that allow air traffic controllers to monitor and direct traffic with the least amount of controller/controller and controller/pilot communications? Controller/controller communication is required when an aircraft moves from one sector to another. Controller/pilot communication is required when the controller issues control instructions to amend an assigned altitude, course or speed.
- **Compatibility with Special Use Airspace (SUA)** – Does the alternative avoid SUA and reduce the interaction between civil and military aircraft?
- **Equipment Compatibility**– Does the alternative consider the compatibility of existing air navigation and air traffic control equipment and the availability of this equipment to FAA facilities and airspace users?
- **Compatibility with Other Procedures** – Does the proposed route structure fit within the regional route structure that will be unchanged?
- **Compatibility with Informal Noise Abatement Procedures** – Does the alternative comply with all informal noise abatement procedures in place at LAS?
- **Compatibility with Airspace Sector Design Criteria** – Does the alternative provide a sufficient volume of airspace that allows air traffic controllers to separate, sequence, and meter efficiently?
- **Community Compatibility** – Does the alternative reduce aircraft over-flight of the more urbanized areas below 10,000 feet AGL?

2.3 EVALUATION OF THE INITIAL ALTERNATIVES

This section evaluates a range of three initial alternatives for modifying the STAAV RNAV SID for eastbound departures from Runway 25 at LAS. Two of the alternatives assess the potential for modifying the STAAV RNAV SID from Runway 25 for east-bound departures. In accordance with CEQ, Section 1502.14 (d) [40 CFR 1502.14 (d)], the No Action Alternative must also be examined. Under the No Action Alternative, there would be no changes to the existing procedures or airspace structure. The evaluation is depicted in the form of a decision matrix followed by a narrative explaining the evaluation. Each initial alternative is quantitatively evaluated against each of the screening criteria outlined in **Section 2.2** of this chapter. The decision matrix is shown in **Table 2.1**.

Table 2-1
INITIAL ALTERNATIVE EVALUATION MATRIX

Alternative	Safety	Traffic Management Efficiency	Air Traffic Controller Utilization	Compatibility with Special Use Airspace (SUA)	Equipment Compatibility	Compatibility with Other Procedures	Compatibility with Informal Noise Abatement Procedures	Compatibility with Airspace Sector Design Criteria	Community Compatibility
Alternative 1 – No Action	Y	N	N	Y	Y	Y	Y	Y	N
Alternative 2 – Develop RNAV SID for eastbound Runway 25 departures	Y	Y	Y	Y	Y	Y	Y	Y	N
Alternative 3 - Develop RNAV SID for eastbound Runway 25 departures flying 10 miles west of the airport before turning east	N	N	N	Y	Y	Y	Y	Y	N

Key:

Y= Concern meets the specified criteria

N= Concern does not meet the specified criteria

2.3.1 Alternative 1: No Action Alternative

In accordance with CEQ, Section 1502.14 (d) [40 CFR 1502.14 (d)], the No Action Alternative (Alternative 1) was examined. The No Action Alternative would leave the current Four Corner Post System in place. Departures from Runway 25 would continue to turn left with the potential to create departure delays as operations increase. The CCDOA would continue to have concerns about meeting forecast demand and operators with eastbound flights would continue to experience departure delays and additional flying miles, as well as incur additional operating costs. (See also **Table 2.1, Initial Alternative Evaluation Matrix**).

- **Safety** – The No Action Alternative is safe and will continue to remain so.
- **Traffic Management Efficiency** – The No Action Alternative is not compatible because it does not provide the necessary traffic management efficiency to manage the increasing demand. This inefficiency has become more exacerbated as demand has returned to pre-September 11, 2001 levels. During peak departure periods, loss of efficiency is incurred because increased separation is required between successive departures. The current procedures direct all Runway 25 departures over a single fix south of the airport. This routing results in additional flying miles and fuel burn for eastbound flights.
- **Air Traffic Controller Utilization** – The No Action Alternative is not compatible because the requirement to route all Runway 25 departures over a single fix south of the Airport would result in increased separation between successive departures during periods of high departure demand. The requirement for increased spacing requires coordination between controllers and has the result of placing additional demands on the TRACON and ATCT.
- **Compatibility with Special Use Airspace (SUA)** – The No Action Alternative is compatible with existing Special Use Airspace.
- **Equipment Compatibility** – The No Action Alternative is compatible because it would not require additional air traffic equipment or on-board navigation systems.
- **Compatibility with Other Procedures** – The No Action Alternative is compatible with other terminal air traffic procedures currently in use.
- **Compatibility with Informal Noise Abatement Procedures** – The No Action Alternative is compatible with existing Informal Noise Abatement Procedures.
- **Compatibility with Airspace Sector Design Criteria** – The No Action Alternative is compatible with the design criteria of Las Vegas TRACON airspace.
- **Community Compatibility** – The No Action Alternative is not compatible because it will not reduce flights below 10,000 feet AGL over the more urbanized areas. With the most recent changes to the Runway 25 RNAV SIDs, the No Action Alternative meets the intent of conformance with the CMA. However, some residents of Enterprise and members of the Enterprise

Town Advisory Board would continue to believe the procedures were imposing an undue burden on their community.

2.3.2 Alternative 2: Proposed Action

The Proposed Action (Alternative 2) would modify existing air traffic control procedures by modifying the STAAV RNAV SID. It would expand the use of the STAAV RNAV SID for eastbound flights departing Runway 25 at LAS. It is estimated that 33 percent of departures from Runway 25 would be changed from the TRALR RNAV SID to the STAAV RNAV SID. Alternative 2 would address the concerns of CCDOA that future increases in traffic could not be accommodated on the existing departure routes without causing airport delays. It would address the desire of operators serving McCarran International Airport for shorter flying distances to destinations east of LAS. It would reduce controller workload previously experienced with the OVETO SID and the excessive coordination currently required by routing all Runway 25 departures over a single fix south of the airport. (See also **Table 2.1, Initial Alternative Evaluation Matrix**).

- **Safety** – Alternative 2 is compatible because it would maintain an equivalent level of safety under varying conditions by providing an alternative route for aircraft destined for airports east of LAS. It would provide additional airspace capacity to meet future forecast demand.
- **Traffic Management Efficiency** – Alternative 2 is compatible because improved efficiency would result as aircraft are rerouted from the TRALR RNAV SID to the STAAV RNAV SID. An estimated 33 percent of Runway 25 departures would be eligible for the STAAV procedure. Departure delays would be reduced thus alleviating on-airport ground congestion. Aircraft assigned the proposed new route would realize shortened leg lengths and reduced fuel burn.
- **Air Traffic Controller Utilization** – Alternative 2 is compatible and would provide a new RNAV departure procedure that would specify finite waypoints and associated minimum crossing altitudes that would ensure aircraft on this route do not infringe upon the airspace delegated to Nellis Air Traffic Control Facility (NATCF). The specified crossing altitudes would also ensure the departing aircraft are safely above the altitudes used by aircraft on arrival routes from the east. Air traffic controller workload is reduced by the reduction in coordination between FAA controllers at LAS ATCT, LAS TRACON and military controllers at NATCF as well as by the elimination of the need to provide radar vectors to the departing aircraft. Alternative 2 would reduce controller workload by reducing the need for additional in-trail separation during periods of peak departure demand.
- **Compatibility with Special Use Airspace (SUA)** - Alternative 2 is compatible with current Special Use Airspace and procedures.
- **Equipment Compatibility** – Alternative 2 is compatible because no additional equipment is necessary on board the aircraft or in the Las Vegas TRACON for implementation.

- **Compatibility with Other Procedures** – Alternative 2 is fully compatible with the terminal air traffic control procedures in use at LAS and NATCF. It does not require any adjustment of airspace boundaries by Los Angeles ARTCC or special flight crew training by the operators serving LAS.
- **Compatibility with Informal Noise Abatement Procedures** – Alternative 2 is compatible with existing Informal Noise Abatement Procedures.
- **Compatibility with Airspace Sector Design Criteria** – Alternative 2 is compatible with the design criteria of Las Vegas TRACON airspace. It would make the best use of available airspace by providing an additional departure route with shortened leg lengths and reduction in controller workload.
- **Community Compatibility** – Alternative 2 is not compatible because it will not reduce flights below 10,000 feet AGL over the more urbanized areas.

2.3.3 Alternative 3: Develop RNAV SID for Runway 25 Eastbound Departures, Flying 10 Miles West of the Airport Before Turning East

Alternative 3 would modify existing air traffic control procedures by modifying the STAAV RNAV SID. This alternative would expand the use of the STAAV RNAV SID for eastbound flights departing Runway 25 by requiring these aircraft fly to a point 10 miles west of the LAS Airport before commencing their right turn.

This alternative would provide relief to some residents of Enterprise and to members of the Enterprise Town Advisory Board as aircraft currently assigned the TRALR RNAV SID would be assigned the STAAV. It is estimated that 33 percent of departures from Runway 25 would be changed from the TRALR RNAV SID to the STAAV RNAV SID avoiding overflight of Enterprise. It would not address the desire of operators serving McCarran International Airport for shorter flying distances to destinations east of LAS. (See also **Table 2.1, Initial Alternative Evaluation Matrix**).

- **Safety** – Alternative 3 is not compatible with maintaining or improving safety under varying conditions. The Alternative would create safety concerns not associated with the current procedure or the proposed Alternative 2. Terrain west of the LAS Airport rises rapidly. Requiring aircraft to fly 10 miles west before beginning a right turn would place them in close proximity to the rising terrain. From 6.2 NM to 10 NM, this Alternative would not comply with the CMA and would place aircraft over more residential areas. Additionally, any procedures further than the existing 6.2 NM turn would prohibit unrestricted climb at a lower altitude due to arrival traffic. It would also place IFR aircraft in conflict with an established VFR flight route that transitions the Las Vegas Class B airspace north to south approximately eight miles west of the airport. This VFR transition route provides aircraft operating on Visual Flight Rules (VFR) access to the Class B airspace on a north/south line between the Jean Airport to the south and the Red Rock Golf Course to the north. The established altitudes along this route range from surface to 5,500 feet MSL. The departure aircraft would create a conflict with aircraft arriving LAS via the SUNST RNAV STAR; this conflict does not exist

with the current procedures or the proposed Alternative 2. Additionally, it may place the departing aircraft in conflict with Alert Area 481 (A-481). A-481 is northwest of LAS and is an area used by the military for high performance climbs and descents during training missions.

- **Traffic Management Efficiency** – Alternative 3 is not compatible because efficiency would not be enhanced by its implementation. The additional flying miles proposed by the alternative would place the departing aircraft in close proximity to the SUNST STAR potentially resulting in departing aircraft being restricted to a lower altitude until traffic conflicts are resolved. It would also place the aircraft in proximity to rising terrain that may require deviation from the procedure, particularly during the summer months when high ambient temperatures exacerbate the LAS density altitude.
- **Air Traffic Controller Utilization** – Alternative 3 is not compatible because its implementation would negatively impact controller workload as it would require controllers to carefully monitor the aircraft's performance and compliance with altitudes relative to the rising terrain west of the airport. It would also require additional monitoring to ensure any potential conflicts with aircraft operating along the Rocks VFR Transition Route or arriving via the SUNST STAR are resolved in a timely fashion. It will require coordination with NATCF air traffic controllers if LAS departures might infringe upon A-481.
- **Compatibility with Special Use Airspace (SUA)** – Alternative 3 is compatible with existing Special Use Airspace.
- **Equipment Capability** – Alternative 3 is compatible because no additional equipment is necessary on board the aircraft or in the Las Vegas TRACON for implementation.
- **Compatibility with Other Procedures** – Alternative 3 conflicts with the SUNST STAR, but is compatible with Other Procedures.
- **Compatibility with Informal Noise Abatement Procedures** – Alternative 3 is compatible with existing Informal Noise Abatement Procedures.
- **Compatibility with Airspace Sector Design Criteria** – Alternative 3 is compatible with airspace sector design criteria.
- **Community Compatibility** – Alternative 3 is not compatible because it will not reduce flights below 10,000 feet AGL over the more urbanized areas.

2.4 SUMMARY OF ALTERNATIVES

Implementation of **Alternative 1**, the No Action Alternative, would make no changes to the existing air traffic procedures in Las Vegas TRACON airspace. It would maintain an equivalent level of safety, but would not meet the stated purpose of this SEA to modify the STAAV RNAV SID for use by eastbound departures from Runway 25 at LAS. It would not provide an opportunity for LAS to meet estimated sustained airport capacity forecast for future demand. It would not meet the demands of operators serving LAS for shorter flying distances to destinations east of LAS.

Implementation of **Alternative 2**, the Proposed Action, would modify existing air traffic control procedures by modifying the STAAV RNAV SID procedure for eastbound departures from Runway 25 at LAS. It would address the concerns of CCDOA that future increases in traffic could not be accommodated with the existing procedures. It would meet the demands of operators serving LAS for shorter flying distances to destinations east of LAS. Further, Alternative 2 would provide improved airspace efficiencies and reduce the potential for departure delays while reducing controller and flight crew workload.

Implementation of **Alternative 3** would develop a new RNAV SID requiring Runway 25 departures fly 10 miles west of the airport before turning right to proceed eastbound. It would not meet the stated purpose of the SEA to modify the STAAV RNAV SID, but would create a new SID procedure. It would not meet the demands of the operators serving LAS for shorter flying distances to destinations east of LAS. It would not provide airspace efficiencies as it would create conflicts with the Rocks VFR transition route through the LAS Class B airspace.

2.5 ALTERNATIVES CARRIED FORWARD

Two of the three alternatives discussed in the previous sections of this chapter, the No Action Alternative (Alternative 1) and the Proposed Action (Alternative 2), were determined to meet the majority of the specified criteria for the Proposed Action and will be carried forward for detailed evaluation.

2.6 DESCRIPTION OF THE PROPOSED ALTERNATIVES

The elements of the Proposed Action and the No Action Alternatives are described below:

2.6.1 Alternative 1 – No Action

The No Action alternative would make no changes to the existing air traffic procedures in Las Vegas TRACON airspace

2.6.2 Alternative 2 – Proposed Action

The Proposed Action Alternative would modify existing air traffic control procedures by modification of the STAAV RNAV SID procedure for eastbound departures from Runway 25 at LAS.

2.7 OTHER ALTERNATIVES CONSIDERED BUT EXCLUDED FROM FURTHER CONSIDERATION

In addition to the initial alternatives described in **Section 2.3**, other alternatives that are identified in the following sections were considered but excluded from further consideration.

2.7.1 Use of Other Modes of Transportation

The use of other modes of transportation (e.g., rail, bus, automobile) would not eliminate the stated purpose of the establishment of a right-turn RNAV SID for eastbound departures from Runway 25 at LAS. Other modes of transportation offer feasible alternatives to air travel, particularly to destinations 250 miles or less. Beyond 250 miles, alternative modes of transportation become less desirable because of cost and time to reach the market. The use of other modes of transportation remains an inadequate alternative for meeting the purpose and need of this SEA.

2.7.2 Use of Other Airports in the Region

The stated purpose of this SEA is the modification of the STAAV RNAV SID for eastbound departures from Runway 25 at LAS. When established, this modified STAAV RNAV SID would provide the opportunity to meet expected demand, provide airspace efficiencies, and provide operational benefit to operators serving destinations east of LAS. No existing airports in the southern Nevada area are capable of accommodating large commercial aircraft. Therefore, use of another airport in the region is not a viable alternative for meeting the purpose and need of this Proposed Action.